

## **ABSTRACT**

An image sensor pixel includes a vertical overflow drain structure to eliminate substrate charge diffusion caused CMOS image sensor noise. An extra chemical mechanical polish step is used to shorten the micro-lens to silicon surface distance in order to reduce optical cross talking. One embodiment uses N type substrate material with P- epitaxial layer to form the vertical overflow drain. Deep P well implantation is introduced to standard CMOS process to prevent latch up between N well to N type substrate. And the photo diode is realized by stacked N well / Deep Nwell and stacked P well / Deep P well to improve performance.